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| EXAMINER | |
|---|---|
| JACOBS, TODD D | |

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| 3746 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/596,239 | DAINEZ ET AL. | |
| | Examiner | Art Unit | |
| | TODD D. JACOBS | 3746 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) 1-31 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-31 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 05 June 2006 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 6/5/2006.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Specification*

1. The abstract of the disclosure is objected to because it contains legal terms such as "means". Correction is required. See MPEP § 608.01(b).

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 1 states "the trigger signal" yet there is no antecedent basis for this limitation. This is found throughout the claims and it is unclear what this refers to. For the purposes of this examination, the "trigger signal" of claim 1 will be interpreted to be "a trigger signal".

5. Claim 1 states "controller associated to the sensing assembly" yet this does not make complete sense. It will be interpreted that the controller and the sensing assembly are associated broadly with one another. This improper use of the phrase "associated to" is also found in claims 6, 7, 9, 10, 12, 14, 16, 17.

6. Claim 1 states "pump comprising a piston displaceable positioned in a cylinder…" yet it is unclear what this means. For the purposes of this examination, the above has been interpreted that the piston is displaceable in the cylinder.

7. Claim 3 states "problem on the fluid pump" yet this is confusing because it appears that this is intended to be "problem of the fluid pump" based on the description. For the purposes of this examination, it has been interpreted this way.

8. Claim 25 states “the storage of the value of the maximum piston…is performed” yet it is indefinite because there has not yet been a mention of storage and this claim seems to be referencing an aforementioned storage. For the purposes of this examination, "the storage" has been interpreted to be "storage".

9. Claim 27 states “turning on...monitoring...decrementing..." but also states "increment" and to follow the series of steps it appears this should be "incrementing".

10. This application is clearly replete with errors and examiner suggests applicant not only look at what is pointed out above, but also (1) look for similar errors in other claims and (2) look for other errors examiner may have missed.

***Claim Rejections - 35 USC § 102***

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 1-2, 4, 12-13, 16, 18-21, 24-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Dovey et al (2003/0219341).

13. In re claim 1, Dovey discloses a fluid pump controlling system, the fluid pump comprising a piston (5) displaceable positioned in a cylinder, the cylinder having a piston displacement stroke and the cylinder having a stroke end, the system being characterized by comprising: a sensing assembly (3) measuring the behavior of the piston, and an electronic controller (2) associated to the sensing assembly, the electronic controller monitoring the displacement of the piston within the cylinder by detecting an impact signal, the impact signal being transmitted by the sensing assembly upon occurrence of an impact of the piston with the stroke end, the impact signal being transmitted by the sensing assembly to the electronic controller, the

electronic controller successively incrementing the piston displacement stroke (see col 2 lines 15-16 where the stroke is gradually increasing) from the trigger signal (drive signals to/from the diver 4) until the occurrence of the impact to store a maximum value of piston displacement corresponding to the piston displacement as far as the stroke end. Examiner would like to note that Dovey's system has been interpreted to have an initial reading where the voltage increases until the vibration occurs, reduces the stroke, and continually adjusts the stroke if future vibrations occur.

14. In re claim 2, Dovey discloses a system according to claim 1, characterized in that the maximum value of piston displacement corresponds to a displacement of maximum efficiency of the fluid pump.

15. In re claim 4, Dovey discloses a system according to claim 1, characterized in that the fluid pump is actuated with a minimum piston displacement stroke (since the stroke is generally increasing there will be a minimum stroke).

16. In re claim 12, Dovey discloses a fluid pump controlling system, the fluid pump comprising a piston displaceable positioned in a cylinder, the cylinder having a piston displacement stroke and the cylinder having a stroke end, the fluid pump being driven by an electric motor fed by electric power, the system being characterized by comprising: a piston-position sensing assembly, and an electronic controller associated to the sensing assembly, monitoring the piston displacement within the cylinder by detecting an impact signal, the impact signal being transmitted by the sensing assembly upon occurrence of an impact of the piston with the stroke end, the impact signal being transmitted by the sensing assembly to the electronic controller; the electronic controller successively incrementing the piston displacement stroke from a trigger signal until the occurrence of impact to store a maximum value of piston

displacement, and monitoring the piston displacement within the cylinder and preventing displacement as far as the maximum value of piston displacement.

17. In re claim 13, Dovey discloses a system according to claim 12, characterized in that the electronic controller prevents piston displacement as far as the stroke end by decrementing the level of voltage applied to the motor (see col 2 line 21).

18. In re claim 16, Dovey discloses a system according to claim 13, characterized in that the sensing assembly comprises a position sensor to sense the piston displacement, the position sensor being associated to the electronic controller.

19. In re claim 18, Dovey discloses a fluid pump controlling method, the fluid pump comprising a piston displaceably positioned in a cylinder, the cylinder having a piston displacement stroke, and the cylinder having a stroke end, the method being characterized by comprising the steps of:

(a) monitoring the piston stroke in the cylinder to detect an impact thereof with the stroke end,

(b) monitoring the piston stroke for a stabilization time (this time is the monitoring time in col 2 lines 16-18), and

(I) incrementing the piston stroke if no impact occurs during the stabilization time and repeating the step (b), or

(II) decrementing the piston stroke if an impact occurs during the stabilization time.

20. In re claim 19, Dovey discloses a method according to claim 18, characterized in that, prior to the step (a), a step of incrementing the piston stroke is performed.

21. In re claim 20, Dovey discloses a method according to claim 19, characterized in that, prior to the step of incrementing the piston stroke, the fluid pump is started with a minimum

piston displacement stroke (since in Dovey the stroke is continually increasing as explained above, there must be started with a minimum stroke).

22. In re claim 21, Dovey discloses a method according to claim 20, characterized in that the step of starting the fluid pump with a minimum piston displacement stroke is carried out upon initiating the functioning of the fluid pump (this minimum stroke is started when the pump is starting).

23. In re claim 24, Dovey discloses a method according to claim 18, characterized in that, after the step (II), the piston stroke is operated in a constant way (a closed loop operation takes place after Dovey is calibrated).

24. In re claim 25, Dovey discloses a method according to claim 24, characterized in that, after the step of operating the stroke in a constant way, the storage of the value of the maximum piston displacement at the electronic controller is performed (after the steady state performance of the pump which comes after the calibration, if the piston again hits the cylinder there is a new storage of the maximum displacement (note that this “displacement” may be in terms of stroke distance, voltage, etc).

25. In re claim 26, Dovey discloses a method according to claim 24, characterized in that, after the step of operating the stroke in a constant way, the piston stroke is monitored (after the closed loop operation after the calibration begins, the piston stroke is still monitored via the sensor).

26. In re claim 27, Dovey discloses a fluid pump controlling method, the fluid pump comprising a piston displaceably positioned in a cylinder, the cylinder having a piston displacement stroke and the cylinder having a stroke end, the method being characterized by comprising the steps of: (a) turning on the fluid pump, causing the piston to displace in the cylinder; (b) successively increment the piston stroke as far as the occurrence of an impact

thereof with the stroke end, (c) monitoring the piston stroke for a stabilization time between the successive increments of the stroke, and (d) decrementing the piston stroke if an impact occurs during the stabilization time.

27. In re claim 28, Dovey discloses a method according to claim 27, characterized in that, in the step (a), the piston stroke of the fluid pump is initiated with a minimum displacement stroke.

28. In re claim 29, Dovey discloses a method according to claim 28, characterized in that, after the step (d), the monitoring of the piston displacement is performed.

29. In re claim 30, Dovey discloses a linear compressor comprising a piston displaceably positioned in a cylinder, the cylinder having a piston displacement stroke and the cylinder having a stroke end, the system being characterized by comprising: a piston-position sensing assembly, and an electronic controller associated to the sensing assembly, the electronic controller monitoring the piston displacement within the cylinder by detecting an impact signal, the impact signal being transmitted by the sensing assembly upon occurrence of an impact of the piston with the stroke end, the impact signal being transmitted by the sensing assembly to the electronic controller, the electronic controller successively incrementing the piston displacement stroke as far as the occurrence of the impact to store a maximum value of piston displacement (note that this stored value may be in terms of voltage, stroke length, etc).

***Claim Rejections - 35 USC § 103***

30. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

31. Claims 3, 5, 9, 22-23, 26, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dovey et al (2003/0219341).

32. In re claims 3, 22-23, 26, 29 Dovey may fail to disclose a method characterized in that the step of starting the fluid pump is carried out periodically or a method characterized in that the step of starting the fluid pump is carried out upon occurrence of a failure/problem or wherein after steady state pumping, storing a maximum piston displacement at the electronic controller is performed.

33. Nevertheless, it is known under normal maintenance to turn pumps off periodically and to also turn pumps off after a failure. After this happens and one starts the pump of Dovey up again, the limitations of the claims would be met. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to turn on and off the pump under normal maintenance in order to properly maintain and fix the pump. In re claim 3, Dovey discloses a system according to claim 2, characterized in that the trigger signal is generated by the electronic controller upon occurrence of a problem on the fluid pump.

34. In re claim 5, Dovey discloses a system according to claim 3, characterized in that the fluid pump is actuated upon occurrence of the trigger signal.

35. In re claim 9, Dovey discloses a system according to claim 5, characterized in that the sensing assembly comprises a position sensor (the position sensor is the impact sensor; when the impact or vibration occurs there is a position known) of the piston displacement stroke, the position sensor being associated to the electronic controller.

36. Claims 3, 5, 9, 22-23, 26, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dovey et al (2003/0219341) in further view of Currier et al (4,502,842).

37. In re claims 3, 22-23, 26, 29 Dovey may fail to disclose a method characterized in that the step of starting the fluid pump is carried out periodically or a method characterized in that the step of starting the fluid pump is carried out upon occurrence of a failure/problem or wherein

after steady state pumping, storing a maximum piston displacement at the electronic controller is performed.

38. Nevertheless, Currier discloses a pump that is calibrated for pump leakage and gets recalibrated at certain intervals. See col 14 line 64-65. Recalibrating Dovey at certain intervals based on time, after pump failures, etc, would help the pump of Dovey to make sure that it is pumping with maximum efficiency most often. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to recalibrate the pump of Dovey at various intervals as tought by Currier in order to maximize pump efficiency.

39. In re claim 5, Dovey discloses a system according to claim 3, characterized in that the fluid pump is actuated upon occurrence of the trigger signal.

40. In re claim 9, Dovey discloses a system according to claim 5, characterized in that the sensing assembly comprises a position sensor (the position sensor is the impact sensor; when the impact or vibration occurs there is a position known) of the piston displacement stroke, the position sensor being associated to the electronic controller.

41. Claims 6-7, 10-11, 14, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dovey et al (2003/0219341) in further view of Oltman (5,224,835).

42. In re claims 6, 10, 14, 17, Dovey fails to disclose a high pass or a low pass filter for the signal associated with the electronic controller. Nevertheless, Oltman discloses using both a high and a low pass filter in order to remove noise from vibration detectors (col 7, lines 1-10). This makes the sensors more effective. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to use high and low pass filters as taught by Oltman to make the sensors more effective.

43. In re claim 11, Dovey discloses a system according to claim 10, characterized in that the signal of piston displacement within the cylinder is transmitted to the electronic controller, the electronic controller preventing the piston displacement as far as the stroke end.

44. In re claim 7, Dovey discloses a system according to claim 6, characterized in that the sensing assembly comprises an impact sensor associated to the cylinder of the fluid pump.

45. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dovey et al (2003/0219341) in further view of Currier et al (4,502,842) as applied above in further view of Oltman (5,224,835).

46. In re claims 6, Dovey/Currier fails to disclose a high pass or a low pass filter for the signal associated with the electronic controller. Nevertheless, Oltman discloses using both a high and a low pass filter in order to remove noise from vibration detectors (col 7, lines 1-10). This makes the sensors more effective. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to use high and low pass filters as taught by Oltman to make the sensors more effective.

47. In re claim 7, Dovey discloses a system according to claim 6, characterized in that the sensing assembly comprises an impact sensor associated to the cylinder of the fluid pump.

48. Claims 8, 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dovey et al (2003/0219341) in view of Oltman (5,224,835) as applied above in further view of Yang (6,176,683).

49. In re claims 8, 15, Dovey/Oltman fails to disclose a system according to claims 7 and 14, characterized in that the sensing assembly comprises an accelerometer fixed close to the cylinder of the pump fluid, the impact signal being generated by the accelerometer.

50. Nevertheless, Yang discloses that when detecting a piston hitting a cylinder/valve plate one could use a vibration sensor as taught by Dovey but also says one could use an

accelerometer (col 4 lines 49-50). Depending on exterior system constraints (exterior vibration that could make the vibration sensor inaccurate, etc), one type of sensor (vibration or acceleration) may be more accurate and it would have been an obvious design choice by one having ordinary skill in the art to choose either of these sensors depending on those design constraints.

51. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dovey et al (2003/0219341) in view of Currier et al (4,502,842) in view of Oltman (5,224,835) as applied above in further view of Yang (6,176,683).

52. In re claims 8, Dovey/Currier/Oltman fails to disclose a system according to claims 7 and 14, characterized in that the sensing assembly comprises an accelerometer fixed close to the cylinder of the pump fluid, the impact signal being generated by the accelerometer.

53. Nevertheless, Yang discloses that when detecting a piston hitting a cylinder/valve plate one could use a vibration sensor as taught by Dovey but also says one could use an accelerometer (col 4 lines 49-50). Depending on exterior system constraints (exterior vibration that could make the vibration sensor inaccurate, etc), one type of sensor (vibration or acceleration) may be more accurate and it would have been an obvious design choice by one having ordinary skill in the art to choose either of these sensors depending on those design constraints.

54. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stuber (4,179,630) or Kim (2003/0161734) in further view of Dovey et al (2003/0219341).

55. In re claim 31, both Stuber and Kim disclose an environment cooler but may fail to disclose the elements of claim 1. Nevertheless, Dovey as explained above discloses these elements and provides and easy and efficient method of maximizing efficiency for a linear compressor. Therefore, it would have been obvious to one having ordinary skill in the art at the

time of the invention to modify Stuber or Kim in view of Dovey in order to achieve the advantages above.

***Conclusion***

56. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yang (6,176,683) and Kim (2003/0161734) have not been relied upon for independent claims but examiner would like to point out that these references are very much relevant to the instant application.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TODD D. JACOBS whose telephone number is 571-270-5708. The examiner can normally be reached on Monday - Friday, 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on 571-272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art Unit 3746

/TODD D. JACOBS/

Examiner, Art Unit 3746